WHAT IS CLAIMED IS

1. A method for assaying DNA fragments in mixture comprising

step 1 of ligating different oligomers hybridizable to primers of the same melting temperature and the same length to individual groups of DNA fragments in a set of DNA fragments;

step 2 of mixing together the groups of DNA fragments ligated with the oligomers;

step 3 of simultaneous PCR of the groups of DNA fragments ligated with the oligomers in one receptacle by using the primers being complementary to the oligomers and corresponding to the individual groups; and

step 4 of detecting PCR amplified DNA fragments.

2. A method for assaying DNA fragments in mixture according to claim 1, wherein the primers corresponding to the individual groups are labeled with fluorophores different from each other in a corresponding manner to the individual groups, to detect PCR amplified DNA fragments labeled with the fluorophores by electrophoresis.

3. A method for assaying DNA fragments in mixture according to claim 1, wherein the PCR amplified DNA fragments are detected by using a DNA probe array

immobilizing plural types of DNA probes of nucleotide sequences complementary to the individual groups of the DNA fragments thereon.

4. A method for assaying DNA fragments in mixture according to claim 1, wherein the primers corresponding to the individual groups are labeled with different fluorophores, correspondingly to the individual groups.

5. A method for assaying DNA fragments in mixture according to claim 1, wherein the primers comprise plural module sequences, each module sequence being composed of 4 to 6 nucleotides, wherein the order of the plural module sequences varies, depending on each of the individual groups.

6. A method for assaying DNA fragments in mixture according to claim 5, wherein the plural modules comprise the same nucleotide species at the 3′ terminus and 5′ terminus thereof.

7. A method for assaying DNA fragments in mixture according to claim 1, wherein the primers corresponding to the individual groups are composed of a 10- to 25-nucleotide common nucleotide sequence in common to the individual

primers of the individual groups and a selective nucleotide sequence being composed of one to 3 nucleotides and recognizing the DNA fragments of the individual groups, wherein the common nucleotide sequence comprises plural module sequences in orders varying, depending on the individual groups, each module sequence being composed of 4 to 6 nucleotides and wherein the selective nucleotide sequence includes all nucleotide sequences of combinations of one to 3 nucleotides.

8. Primers for use for a method for assaying DNA fragments in mixture according to claim 1, wherein the primers comprise plural module sequences in orders varying, depending on the individual groups, each module sequence being composed of 4 to 6 nucleotides.

9. Primers according to claim 8, wherein the plural modules comprise the same nucleotide species at the 3′ terminus and 5′ terminus thereof.

10. Primers for use for a method for assaying DNA fragments in mixture according to claim 1, wherein the primers corresponding to the individual groups characteristically comprise a 10- to 25-nucleotide common nucleotide sequence in common to the primers of the

individual groups, and a selective nucleotide sequence being composed of one to 3 nucleotides and recognizing the DNA fragments of the individual groups, wherein the common nucleotide sequence comprises plural module sequences in orders varying, depending on the individual groups, each module sequence being composed of 4 to 6 nucleotides and wherein the selective nucleotide sequence includes all nucleotide sequences of combinations of one to 3 nucleotides.

11. Primers according to claim 10, wherein the plural modules comprise the same nucleotide species at the 3′ terminus and 5′ terminus thereof.

12. Plural primers with different nucleotide sequences for use in PCR, wherein the primers comprise different orders of plural module sequences composed of plural nucleotides and the plural primers thus comprising such different orders of plural module sequences are of the same melting temperature.

13. Plural primers according to claim 12, wherein the plural modules comprise the same nucleotide species at the 3′ terminus and 5′ terminus thereof.

14. Plural primer sets of plural primers with different nucleotide sequences for use in PCR, wherein each primer set is composed of a 10- to 25-nucleotide common nucleotide sequence in common to the primers of each primer set and a selective nucleotide sequence being composed of one to 3 nucleotides and recognizing DNA fragments derived from sample DNA, wherein the common nucleotide sequence comprises plural module sequences in orders varying, depending on each primer set, each module sequence being composed of 4 to 6 nucleotides and wherein the selective nucleotide sequence includes all nucleotide sequences of combinations of one to 3 nucleotides.

15. Plural primer sets according to claim 14, wherein the plural modules comprise the same nucleotide species at the 3′ terminus and 5′ terminus thereof.

16. Plural primer sets according to claim 14, wherein the plural primers of the plural primer sets are of the same melting temperature.